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**ASSESSING THE IMPACT OF
PUBLIC SPENDING ON THE HEALTH OF
VULNERABLE POPULATIONS:
A FRAMEWORK FOR EVALUATING
HRSA PROGRAMS**

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HEALTH RESOURCES AND SERVICES ADMINISTRATION

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Assessing the Impact of Public Spending on the Health of Vulnerable Populations:

A Framework for Evaluating HRSA Programs

I. Introduction

The federal government has assumed a central role in assuring adequate health care for vulnerable populations through the programs and activities of the Health Resources and Services Administration (HRSA), a division of the Department of Health and Human Services' Public Health Service. Through the programs it administers, HRSA seeks to build and sustain an infrastructure of health services for the poor and others who are at risk of underservice. It funds the direct provision of services as well as augments and coordinates the health care resources available to vulnerable groups. The activities of HRSA attempt to mitigate the barriers that keep many from obtaining preventive and curative health services. Many times these barriers are related to a lack of health care resources within a geographic area, an inappropriate matching of services or providers to individuals' needs, or insufficient organization of services. Other barriers are financial in nature, as many of the poor are uninsured. Major programs of HRSA include the maternal and child health (MCH) block grants, health centers, the National Health Service Corps (NHSC), and the Ryan White programs for persons infected with HIV.

The health care environment in which HRSA programs operate is changing in ways that could increase access barriers for vulnerable individuals seeking health care. (See Appendix A for an overview of vulnerable populations.) Efforts by employers, insurers, and federal and state governments to rein in the growth of health care costs are limiting the flexibility of providers to address the special needs of the poor and uninsured. (See Appendix B for an overview of health

care providers.) As businesses, the main purchasers of health care, become more cost-conscious and demand slower premium growth, hospitals and practitioners find third-party payments less able to cover the costs of uncompensated care. Moreover, the proliferation of managed care organizations, with their emphasis on delivery efficiencies, has further reduced the resources once available to subsidize care for those who could not pay.

Faced with rising health care costs as well, federal and state governments are intensifying their efforts to reduce the growth in health care spending, which may have further consequences for the health care "safety net." Plans to convert Medicaid to a block grant program and substantially reduce its projected growth will likely lead to enrollment reductions, thus increasing the number of people who will need subsidized care at the point of service. While efficiencies from increased use of managed care could enable fewer dollars to cover more people, even after taking that into account, experienced analysts estimate that by the year 2002, 8 million fewer people will be enrolled in Medicaid than would qualify for benefits under **current law**.^{a,1} In addition, the recent secular increase in the number of uninsured is not expected to abate, with nearly 40 million uninsured at some point in 1994.² As a direct result, more of the poor will become reliant on subsidized or free care, such as that provided by HRSA-funded health centers. Simultaneous attempts to cut HRSA programs significantly could, therefore, compound access problems. The ramifications of scaling back these discretionary health programs, as well as Medicaid, are potentially serious for the vulnerable populations targeted by HRSA, for it is

^a This projection assumes that managed care saves 20 percent of the costs of acute care Medicaid for adults and children, and that overall expenditure per beneficiary growth is held to inflation plus 1.9 percent beginning in 1996.

unclear whether state, local, and private resources will be able to fill the gaps created by federal budget cuts that cannot be closed by managed care savings.

In order to determine the effect of reductions in federal spending, it is first necessary to understand the role that federal programs that finance or deliver health services currently play in enhancing health outcomes of the poor and underserved. Personal health care service is only one of many components that determine an individual's health status. Though the dramatic rise in medical care spending in recent history has corresponded with declining mortality, the causal empirical linkage between the two trends is not very strong. According to many researchers, very little of the drop in mortality rates since 1900 can be attributed to spending on medical care.' Overall, behavioral and environmental factors are believed to be of greater importance in explaining mortality than medical care.⁴ Such conclusions illustrate the difficulties inherent in linking specific health services, which may have proven efficacy in clinical trials, to positive health outcomes that substantially affect the quality of life and mortality.

This paper will explore analytic approaches to measuring the relationship between health services, specifically those supported by HRSA, and health outcomes. Section II develops a conceptual framework that describes how specific health outcomes of vulnerable populations might be traced back to HRSA programs. In outlining the linkages between programs and outcomes in some detail, we will articulate why it is difficult to demonstrate the quantitative impacts of specific programs, how the analytical capacity for doing so might be improved by new data and measures, and how current public and private developments (e.g., proposed Medicaid cuts and more competitive private insurance payments, respectively) could be traced to services received, health outcomes obtained, and the health status maintained by current and future

vulnerable populations. This framework could serve to advance the current debate over the health care safety net by focusing attention on the data items needed. to more accurately evaluate the links between public spending and the health of vulnerable populations. Section **III** discusses how analysts might apply the general conceptual framework despite the data limitations of the present time, using the MCH program as an example. Finally, we outline data collection efforts that would strengthen future evaluations.

II. Impact Analysis: General Conceptual Model

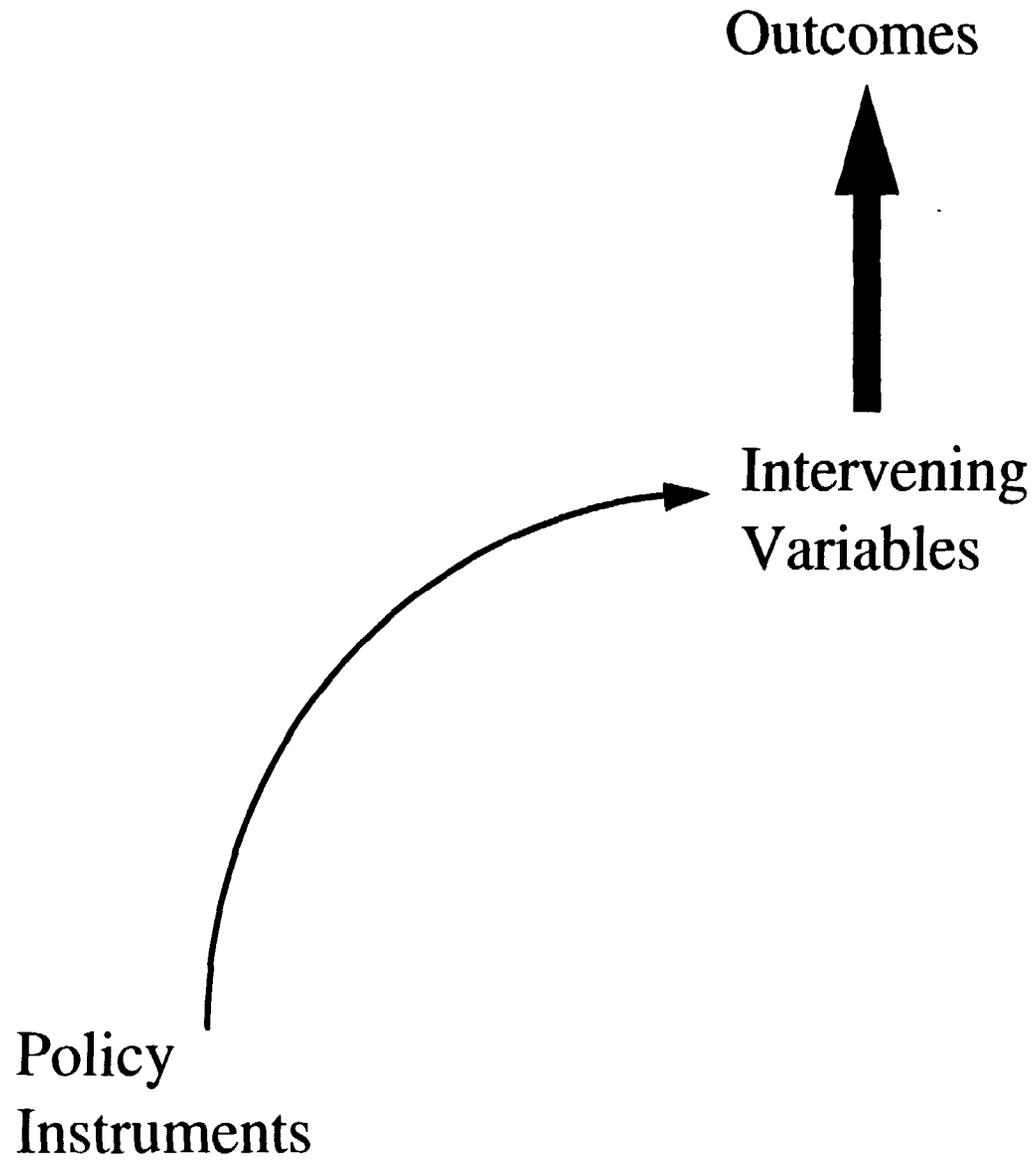
The goal of any health care program is to improve or maintain the health of the target population. In the particular case of HRSA, the target population consists of those vulnerable groups that are described in Appendix A. While the goal is clear and the various programs have been designed to accomplish the ultimate goal, establishing definitive linkages between specific health programs and health outcomes for a target population outside a controlled clinical trial is extremely complex. Difficulty in establishing causal linkages results partly from the fact that some of the phenomena involved **are** inherently **difficult** to measure accurately, and partly from the fact that many interrelated **influences** or intervening variables mask or even counteract the possible effects of policies. It is, therefore, difficult to devise clear guidelines for cost-effective resource allocation decisions, as well as to definitively evaluate arguments about programs' effectiveness. This inability to clarify the impact of specific programs is particularly unfortunate in a time of fiscal restraint, for across-the-board cutbacks may lead to a less effective public resource allocation than an informed re-targeting might produce.

II. A. The Model

Figure 1 illustrates, in simplified terms, **the analytic difficulty of** establishing programmatic effects or causality. Policies, try as they might, do not produce outcomes **directly** or immediately. Outcomes, especially health outcomes, are the result of many different forces operating at once, and programs must usually work through many of those indigenous forces, **or** intervening variables, in order to reach the target population. At best the intervening variables merely mediate the policies' effects. At worst, the intervening forces counteract or negate **the** effect of the policy, so that the program may have no easily observable and demonstrable **effect**, unless analysis can carefully control for the specific **influences** of the intervening variables. **It** is possible that in the absence of the policy the outcome would have been worse, but this reality **may** be difficult to sort out from the myriad intervening influences. It is also possible that particular programs could be inherently ineffective, due to poor design, execution, or unintended and unanticipated consequences. The analysts' task is to sort out competing **influences** carefully, so that policy makers understand the implications of their choices. This is especially true if the benefits of a program are diffuse (e.g., a prenatal educator encouraging a prospective mother to have her toddlers immunized).

Figure 2 illustrates this same point with more detail and lays out a general model for evaluating **HRSA** programs as well as the effects of changes in other public programs, such as Medicaid, on the health outcomes of vulnerable populations. This model could also be expressed through a series of equations, which are expressed in some detail for the interested reader in Appendix C. The fundamental hypothesis is that health outcomes are determined by the health status of the patient and health services received. The general point of the conceptual model is

Figure 1



W hat the effects of specific programs (denoted with an asterisk * in Figure 2) work their way through various intervening variables (eventually health services and health status) on their way to outcomes. Specific quantifiable effects of the programs may or may not be discernible within the current state of the art of empirical methodologies. Nevertheless, the model conceptualizes potential linkages between cause and effect, thereby suggesting hypotheses to test and highlighting areas of the most significant uncertainty and the highest priority for measurement improvement.

Health status is assumed to be determined by heredity, the physical environment in which the person lives, behavioral choices, and health services received in the past. For simplicity one might model “the past” as one time period ago, but in reality, specific services received (or not) in one’s childhood could have profound effects on health status in adulthood. Heredity and to some extent the physical environment are exogenous to the individual, i.e., they are out of the control of the **individual**.^b Behavioral choices, however, are posited to be determined by education, income, health insurance, the behavioral norms or culture of one’s chosen peers and perceived health status, as well as by health services and health outcomes received in the past. These behavioral choices are idiosyncratic and fundamentally endogenous, i.e., they are under the control of the individual decision maker and not independent influences on health status and ultimately health outcomes, since behavior is influenced by past services and outcomes. Some analysts might argue that the “determinants” of behavioral choices are endogenous as well, for they too result from choices the individual makes or has made. The overwhelming endogeneity of

^b While all individuals can move, many members of vulnerable populations may not have a great deal of choice about the type of environment in which they can afford to live.

behavioral choices will affect the appropriate empirical strategy for impact analysis in important ways that will be discussed below.

The other major determinant of health outcomes, health services received, are a function of the local supply (both quantity and quality) of providers willing to treat vulnerable populations, the health service processing capacity of the individual, perceived health status, and the ability to pay for health services. The supply of willing providers is presumed to depend upon local provider market conditions: the number of physicians and hospital beds per capita; the number of hospital outpatient departments and emergency rooms or the number of health personnel per capita employed there; the number of community and migrant health centers (**CMHCs**) or the number of health professionals per capita employed there; and the number of NHSC personnel per capita in the local area if they practice outside **CMHCs**. In addition, the local supply of willing **providers** will be influenced by Medicaid payment policies (these could differ in relative attractiveness across **provider** types), Medicaid enrollment policies, and the degree to which private payers can be overcharged to help subsidize care for the poor and vulnerable. This last influence is **inversely** related to the **degree** of competitiveness in local health service markets. For example, if **private** health plans have negotiated the prices they pay hospitals down to the true average cost for their enrollees, then hospitals have only limited abilities to cross-subsidize indigent care. This will, on average, reduce their willingness to treat and serve vulnerable populations.

Note the number of both health centers and NHSC personnel are directly related to HRSA funding initiatives. In addition to the direct effects of Medicaid spending on private providers generally, captured in the Medicaid payment and Medicaid enrollment variables, Medicaid

spending could directly affect the supply of health center services, since it accounts for 33 percent of health center funding at present.' Therefore, Medicaid enrollment cutbacks and payment reductions, inevitable results of the block grant proposals in the 104th Congress, could put **increased** pressure on local delivery systems for the poor and vulnerable populations and thereby ultimately reduce the quantity and quality of services received by all those dependent on health center providers. **Potential** indicators that Medicaid spending reductions are affecting local service delivery to vulnerable populations are discussed below.

Service processing capacity represents the commonly held assumption that individuals produce their own health outcomes with different inputs: their own and those they purchase or otherwise receive. The ability to produce health, all other things equal, depends upon the patient's knowledge base and attitudes about information and treatments that may come from health professionals. Some individuals, with ample private human capital (derived from education, income, and **culture**), have service processing capacities ranging from adequate to outstanding. Others, including many members of vulnerable populations, must develop service processing capacity through a social infrastructure, built up from educational programs for clients and care givers alike, programs that enable beneficiaries to connect to the myriad social service and health programs for which they may be eligible, and general outreach services, including transportation services, that may be necessary for health services to be effective in the production of health. The ability to pay for health services is a direct function of income and health insurance coverage.

This completes our discussion of the major elements of the general conceptual model. This model can serve as a framework for policy analysis and research strategy development. The

sections that follow discuss empirical and analytical issues that should be considered when using the model for program evaluation. An example of the model's application is discussed in Section III.

I. B. Issues Involved in Testing for Policy Effects

Theoretically, evaluating the effects of HRSA-sponsored programs on health outcomes could proceed with the estimation of an equation that combined all the relevant variables that might affect each outcome measure of interest. This method would explicitly test specific hypotheses about the effects of various programs. The statistical significance of the estimated coefficients on program characteristics (e.g., dollars spent on prenatal nutritional education programs) would indicate whether there is an effect, and if so, the magnitude of the coefficient would indicate the size of the effect. However, the sheer number of variables and concepts represented in Figure 2, as well as the intricate web of relationships among them, suggest that the estimation of specific effects on outcomes that can be unambiguously attributed to specific health care programs is extremely complex. In this sub-section, we discuss why, highlighting four major estimation issues. We conclude this sub-section with a discussion of some intermediate measures and hypotheses that could serve as indicators of possible effects in the absence of definitive causal proof. This set of interim indicators could guide both newly focused data collection efforts and reasonable inferences about the short run consequences of current market and policy developments.

I. B. 1. The Unit of Analysis

The first methodological choice is the unit of analysis. With a focus on health outcomes of the target population, the alternative units of analysis are (1) individuals, both users and non-users

in the target group or (2) the target group as a whole (users and non-users) in a particular geographic area.

The appeal of the individual as the unit of analysis is strong. The individual is the basic decision maker for most health production choices, and the health outcomes of vulnerable individuals trying to navigate our complex health delivery and financing systems are the ultimate targets of HRSA programs. However, there are good reasons the individual is typically not used as the basic unit of **analysis** in most empirical studies of program effects.

First, data are often not available for individual level observations of key explanatory variables, like education, income, and health insurance status. No single nationally representative household survey collects data on health outcomes, economic variables, so&demographic variables, and health service utilization in sufficient detail to provide a proper primary data set for outcomes analysis. Equally serious, key heredity and environmental variables are often unobservable for individuals. Finally, and most problematic, the sample of users or program participants may differ from the sample of non-users in undetectable ways. Individuals' behavior is endogenous to their own health status observations about themselves, their attitudes about specific health services received, and their perceptions of the health consequences and outcomes of their behavior. This endogeneity of individuals* behavior to outcomes builds in a fundamental simultaneity to any outcomes model as long as the unit of analysis is the individual. If analysts could completely specify and measure all the primary attitudinal determinants of behavioral choices, or control for individual-specific heterogeneity through a panel data set (with observations on the same people over multiple years), then the simultaneity problem could be overcome, at least theoretically. However, since many of these attitudes are unmeasurable and

certainly unmeasured at the moment, from a statistical point of view **individuals' behaviors reflect** an unmeasured heterogeneity among individuals that can bias any parameter estimate purporting to measure the effect of a policy variable on a particular **outcome**.⁶

For these reasons, and because the average net effect on a target population as a whole is also a goal of policy makers, a local target population as a whole (including users and non-users) is more often used as the unit of analysis. For example, in testing for the effects of policy interventions on maternity outcomes, the percentage of low birth weight babies born in a particular county is often used.' This approach finesses the unmeasured heterogeneity issue by implicitly assuming that the distribution of heredity, environmental, and idiosyncratic behavioral factors is either constant across geographic units or is captured by county-specific controls. Furthermore, county-level data on per capita income and other so&demographic variables are regularly collected and reported.

However, this aggregative solution to the data availability and unmeasured heterogeneity problems of individual level analysis causes problems of its own. The causal links between explanatory variables and outcomes may be more tenuous at the aggregate level, and there is less variation in some of the explanatory variables at the aggregate level. For example, the effect of a county's per capita income on the percentage of low birth weight babies is unlikely to be as robust as the effect of household income on individual mothers' outcomes. Using census tract or zip code income information is much better, but it is not possible in all applications. As another example, county population as a whole, even when stratified by race, is not the same as the target population, yet the data on the natality files do not permit segmentation of the total population into separate income groups. Finally, the choice of geographic unit over which to aggregate is

typically the county because that is the level at which many data are available, **not because health service** markets are exactly county-wide. In the end, the choice of unit of analysis involves a tradeoff between the ability to directly measure more influences at aggregated levels and reduced confidence that those measures are directly related to specific outcomes for the target population.

Two new HRSA data initiatives could alleviate some unit of analysis and measurement problems. The first is the current effort to attach geographic codes, possibly at the sub-county level, to National Health Interview Survey (**NHIS**) observations. This would permit a potentially rich **array** of local characteristics describing health service markets and general socioeconomic conditions to be added as explanatory variables in studies using the individual as the unit of analysis. The second initiative underway is the 1995 Survey of Community Health Centers, a collaborative effort of HRSA and the National Center for Health Statistics. This survey captures significant amounts of information from approximately 2,000 patients at 50 **CHCs** across the country. Data on demographics, functional status, income, presence of health care conditions, service use, source of care, and health-related behaviors were collected. In addition, clinical information about the visits was obtained. Since the core survey instrument is the same, health utilization and outcomes measures of this sample population could be compared with individuals surveyed in the NHIS who do not use **CHCs**.

II. B. 2. Measurement Issues

Some of the concepts outlined in Figure 2 and throughout the general model specification are, unfortunately, difficult to measure precisely, and some dimensions of the concepts may be omitted altogether. This could reduce the validity of statistical inferences about programs' and other variables' effects. For example, providers' willingness to serve vulnerable populations

depends upon the payment received for those services, whether directly from programs for the vulnerable or from providers' ability to cross-subsidize with above-cost payments from private payers and Medicaid (e.g., disproportionate share payments to hospitals). However, there is no systematic data collection of private sector payment rates, so analysts' ability to control for this important determinant of provider behavior is approximate at best. If providers are not willing to accept vulnerable patients at the margin, then even if HRSA programs generate a significant increase in their service processing capacity, they may be unable to acquire the services they need to improve their health outcomes. Not being able to control for providers' willingness to accept vulnerable patients at the margin, then, could bias tests of HRSA programs' effectiveness.

Similarly, HRSA grants for patient education programs could be measured in dollars, **full-time equivalent (FTE)** health educators, or number of trainees served, but it is the quality of the **information** actually received by vulnerable patients that **determines** the effectiveness of the social infrastructure, and this is not measurable without extensive new survey instruments. The same could be said for grants that support linking individuals to services; it is the quality of the connection **between** the beneficiary and the providers that ultimately determines the productivity of the **social infrastructure** in generating health service processing capacity. If the quality of information or connection is uncorrelated with the amount of HRSA resources or the local size of the program, then this omission will not bias the estimates of direct program impacts. But if quality is correlated with size, either positively or negatively, then omitting quality could bias the estimates in an unknown direction.

II. B. 3. Statistical Issues (Simultaneity and Self-selection)

In the discussion of the unit of analysis, we described how the endogeneity or simultaneity of behavioral choices makes individual-level estimation problematic. Evaluation studies that attempt to avoid the problems of individual measurement by comparing outcomes of “treatment” groups with “control” groups must guard against the equally vexing problem of selection bias. In a particular locale, clients who repeatedly seek HRSA services may be fundamentally different than those who do not, and so comparing outcomes across these groups as if “all other things are equal” is unlikely to be valid. Similarly, across geographic locations, simply comparing the outcomes of those in areas with and without **CMHCs** or NHSC personnel may be equally tainted by locally relevant intervening variables (such as private payment rates or churches with hospitals and health education outreach services) that must be controlled for to produce valid inferences about program effectiveness. A particular locale’s health delivery infrastructure, e.g., a decision about whether or not to have a **CMHC**, depends upon a host of local variables. At the same time, HRSA decisions about where and how large a grant to make to a particular local provider of MCH or **CMHC** services could very well be endogenous to local conditions. The general point is that any valid analysis must be multivariate and must address the potential for selection bias both on the part of patients and of locales as well of endogeneity of a number of variables.

II. B.4. Timing

The discussion so far has ignored **the** reality that programs’ interventions **with** individuals take time and that the effects of some programs may not manifest themselves until years after their implementation. There are few general statements that can be made here, other than the obvious one that the time period of the evaluation study should coincide with the most likely interval over

which the policy should have worked its way into measurable outcomes. This could be less than a year or multiple years, depending on the policy intervention and the outcome involved.

II. C. Interpretation of Imperfect Tests -- Interim Measures

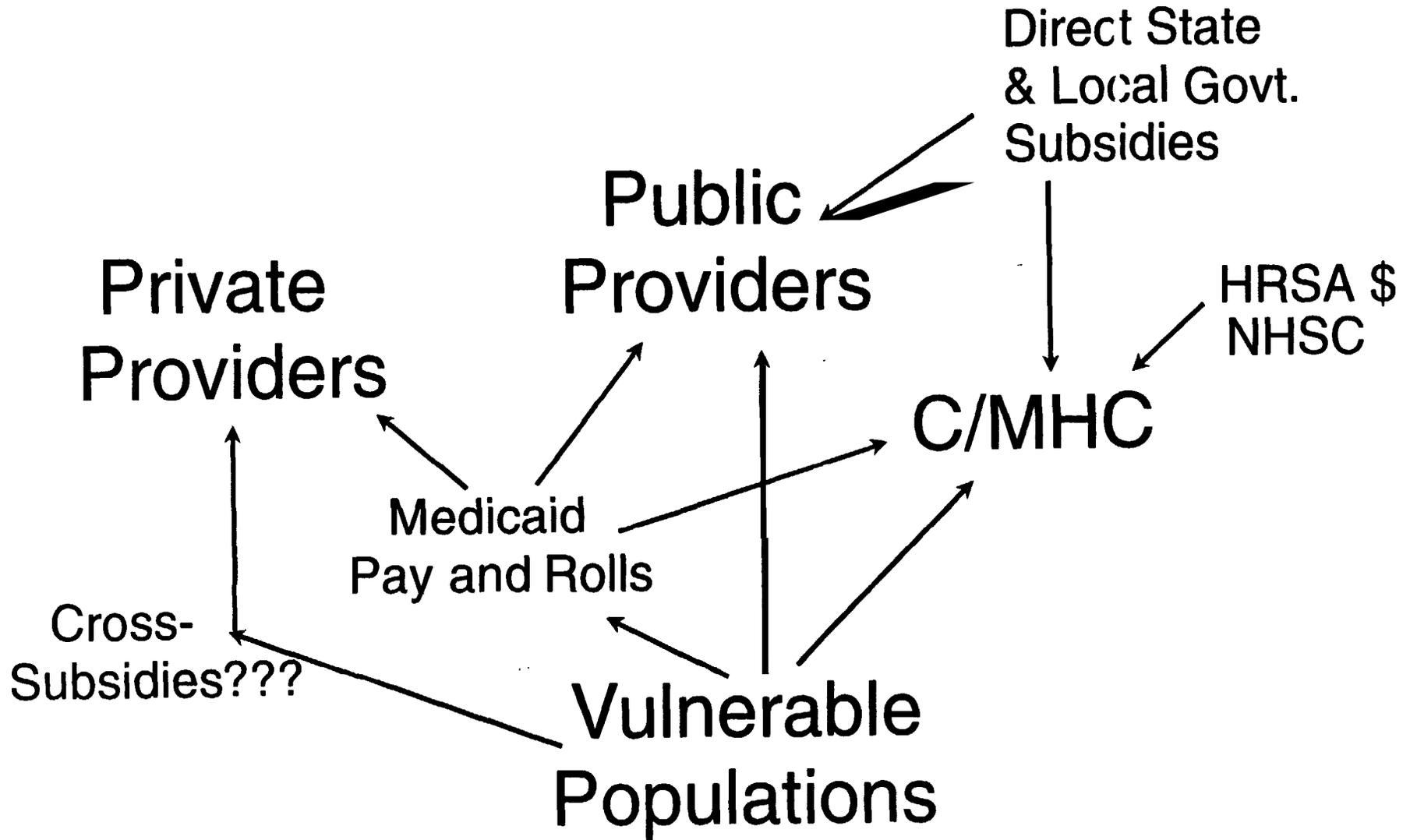
While it is important to understand the long list of complexities involved in properly assessing the impact of public spending on the health of vulnerable populations, it may be even more important to remember Talleyrand's judgment about the excesses of the French Revolution: the perfect is the enemy of the good. Very few endeavors in real life could meet the rigorous standard of statistical proof of effectiveness set out by modern econometric theory. Our ability to measure the relevant variables and to specify the exact nature of the many inter-relationships is too limited. The appropriate conclusion, however, is not to end all programs and to despair of proper statistical tests, but to adopt a two-track strategy. On the first track, data collection and dissemination efforts need to be re-focused on particular areas where improvement is both essential and possible. (Some of these will be highlighted in the next section on the application of the general model.) On the second track, interim measures derived within the context of the general conceptual model can serve as indicators of effects that may be of interest to policy makers while analysts improve the capacity to test for specific programs' overall effectiveness.

II. C. 1. Interim Measures for Medicaid Program Reductions

To illustrate the second strategic track, we focus first on the potential effects of significant reductions in Medicaid spending at a time when support of the public health infrastructure is also declining. Figure 3 presents a stylized view of the current flow of patients and dollars.

Most vulnerable populations receive health services from three classes of suppliers: staffs of C/MHCs, public providers, and providers in private practice. Some vulnerable populations are

Figure 3. Tracing Effects of Reduced Medicaid and Public Health Spending



eligible for Medicaid at the present time, and they bring Medicaid payments with them to either the private providers who are willing to treat them, to **C/MHCs**, or to public providers. Other vulnerable populations are not eligible or enrolled in Medicaid, and they receive services from the same classes of providers, though the willingness to provide uncompensated care depends upon the existence of some kind of cross-subsidy or direct subsidy. Historically, cross-subsidies have come from charging the privately insured more than the costs of providing care to them and from **providers themselves**. Examples of direct subsidies are federal grants to a **C/MHC** or grants from county governments to local public hospitals.

As an example of tracing and interpreting the linkages specified in the diagram, suppose Medicaid funding was increased considerably and that the reaction to the increased funding was to **both** increase the payment rates for health services and expand the rolls by increasing the number of eligible and enrollment outreach efforts. Then, *all other things equal*, relatively more of the vulnerable would be enrolled in Medicaid, and more providers would willingly treat them because of the higher service payment levels. This would likely decrease both the total number of patients and the fraction of non-paying patients seeking care in **C/MHCs**, and this could, in turn, justify some reductions in HRSA program dollars that support them and the NHSC, for the need would have been reduced by increased Medicaid spending.

Alternatively, suppose that Medicaid spending is reduced, relative to baseline, as proposed by both the 104th Congress and the President. Then, if Medicaid policy makers react symmetrically to the spending cut as we postulated they would to a spending increase, both payment rates and Medicaid enrollment will decline. Further suppose that simultaneously, private health service markets become more competitive, at least insofar as prices more closely reflect

average costs, so that the size of the cross-subsidies from the private sector that could finance uncompensated care is substantially reduced. As a consequence of both of these actions, *all other things equal*, both the total number of patients and the fraction of non-paying patients seeking care in **C/MHCs** would increase. This increased pressure could, in turn, justify an increase in HRSA program dollars that support them and the NHSC. Simultaneous cuts in **C/MHC** and NHSC funding, relative to baseline, would put even more pressure on the delivery system serving vulnerable populations, reducing the quantity and quality of the care they receive, and perhaps reducing their health status in the longer term.

However, before such conclusions are reached, the potentially intervening factors implicitly embedded *in the* phrase, *all other things equal*, must be investigated. The Medicaid reform proposals being considered have both growth rate restrictions *and increased flexibility* for the states to deal with reduced federal funds. Most of them appear to be considering placing many or most Medicaid enrollees into some form of managed care arrangement if the funding restrictions pass. (About 22 percent are in managed care already.) To the extent that managed care can deliver health services more efficiently than fee-for-service Medicaid did in the past, the increased pressure on **C/MHCs** from Medicaid budget cuts will be attenuated. Moreover, increased private sector competitiveness may be helpful in two ways. One, efficient private managed care plans are developing the techniques for controlling health care costs that the public sector might be able to take advantage of. Two, private sector competition, by driving down private prices, could permit Medicaid to reduce health service payment levels without reducing *the relative* attractiveness of Medicaid patients vs. private payments. Furthermore, as clinical and cost-management techniques spread, **C/MHCs** themselves could become more efficient or even

join managed care networks and spread the use of cost-effective health care delivery patterns even further. Thus, we cannot conclude *a priori* that Medicaid funding reductions, coupled with increased state flexibility to use managed care and increased private market competitiveness, are unambiguously bad for vulnerable populations and the public health infrastructure that serves them. Data must be collected and analyzed before even interim conclusions can be reached.

These data would include the number and fraction of non-paying and paying patients seeking care in **C/MHCs** now and each year as the Medicaid changes are implemented (assuming they pass and are signed into law). The Uniform Data System of **HRSA's** Bureau of Primary Health Care collects this data. In addition, it would be highly desirable to supplement this data with information on Medicaid enrollees' changing patterns of **C/MHC** use as more switch from fee-for-service coverage to managed care. Medicaid claims data would be useful to track **C/MHC** use in a fee-for-service environment; yet other methods, including a survey of Medicaid enrollees, may be necessary for observing **C/MHC** use patterns under a capitated managed care scenario. As Medicaid enrollment in capitated plans increases, some **C/MHCs**, namely those that do not join managed care networks, will lose former paying Medicaid customers to managed care plans.

Ideally, analysts would control for the potential increase in demand for **C/MHC** services that may result from the secular trend of increasing uninsurance generally. This is difficult to document for particular locales, since sub-state estimates of the uninsured cannot be generated by the Current Population Survey (CPS) or the NHIS. State-specific estimates, however, can be created in all states by pooling the CPS over three years. A series of averages using rolling three-year CPS trends would at least provide a benchmark rate of increase in the uninsured. The new NHIS sample design (starting in 1995) that will permit state-specific estimates for a number of

states and three-year merges to be done for all states may also prove quite useful here. In general, increases in the number of uninsured people would be expected to increase the demand for subsidized or free care.

Another indicator of potential successes or strains on the local health care delivery systems that is readily available at present is the amount of uncompensated care delivered by hospitals. These data are collected yearly by the American Hospital Association (AHA) on a hospital-specific basis and could be aggregated by county or other geographic unit. The AHA annual surveys also ask for the percentage revenue that comes from Medicaid. Yearly American Medical Association (AMA) surveys of physicians also ask for the percentage of patients that are Medicaid recipients. All of these variables in tandem, aggregated over the right geographic areas and placed in the proper policy context, could provide a reasonable picture of how the patient and dollar flows in the local health care delivery system are faring under the New Federalism initiatives. They could indicate on an interim basis whether more C/MHC and NHSC dollars were justified.

II.C.2. Interim Measures for Health Centers

The health centers supported by HRSA grants, including C/MHCs, Health Care for the Homeless projects, and Public Housing Primary Care projects, deliver comprehensive primary and preventive care to underserved populations. A priority of these centers is to ensure that the health of vulnerable individuals is sustained or enhanced, making unnecessary more intensive and costly medical treatments.

Potential reductions or freezes in federal funds for health centers may have adverse consequences for individuals who now rely on these publicly subsidized centers. Although one

would prefer to use direct measures of health status to quantify the impact of funding cuts, these data are very expensive and consequently are not collected uniformly or consistently. More readily available interim measures of whether comprehensive, preventive health care is being delivered include: (1) admissions to the hospital for preventable conditions, (2) the use of the hospital in general, and (3) overall costs of care. These data are at least partially available at the individual level for those health center patients covered by Medicaid and **Medicare**.^c For others, individual patient hospital discharge data are often available by zip code and **payor**. Though “interim,” these measures may actually be more cost-effective to collect and use as dependent variables than health status, as represented, for example, by hypertension level, blood sugar level, activities of daily living (**ADLs**), and mortality. Monitoring changes in these interim measures over time could serve as the basis for a time trend analysis. Again, regularized surveys of **CMHC** clients, like the 1995 survey, would significantly improve our analytic capacity. Also again, supplementing this survey with a survey of Medicaid enrollees is particularly important because of the various sites of care used by Medicaid and uninsured patients. Exploring ways to record unique **CMHC** client identification numbers on hospital records may significantly improve our ability to track patients through the health care delivery system. In general, minor but creative modifications and uses of administrative data bases may well be worth considerable investment.

To illustrate how applying the model can identify useful interim measures, suppose funding for health centers were cut or not allowed to grow in response to increasing numbers of uninsured and poor. Before any changes in the rate of preventable hospitalizations were

^c The ease of collecting this information on Medicaid patients varies from state to state based on the format of the claims. Out-of-pocket spending by particular Medicare beneficiaries is not generally available.

observed, one would expect to first see a reduction in the number of centers or their overall capacity. The latter would manifest itself in fewer persons obtaining appointments (no acceptance of new patients), greater delays in obtaining care at a health center, or higher patients-to-physician ratios. For those patients who maintain access to a health center, a higher proportion could be publicly or privately insured, since decreased federal funding would limit centers' ability to support services for the uninsured. Information on appointment delays and insurance mix would have to be collected on a center-by-center basis. These data could perhaps be compiled and monitored at the state level, with the expectation that problems will be greater in states with heavier Medicaid acute care cutbacks.

The impact of federal budget cuts on health centers and their target populations should be evaluated in light of other changes in the health system that occur simultaneously. As mentioned before, health centers may become more efficient by operating within managed care networks and, consequently, be able to offset some of the reduction in federal grant monies. Moreover, appointment delays, inability to accept new patients, or closure of health centers may be muted by the creation of new capacity or use of existing capacity of other providers, many who already see CHC users. For example, if a health center closed in a community, one might expect an increase in the number of persons using the hospital emergency room as their usual source of care. This, in turn, might reveal itself in higher costs of care overall--whether covered by Medicaid or counted as bad debt--or in a higher rate of preventable admissions (if the care delivered in hospital outpatient departments is less effective, continuous, and comprehensive). On the other hand, closing or downsizing a health center could engender other willing providers to come forward, such as charitable clinics and office-based physicians who might willingly serve more of the poor

in response to a perceived local “crisis.” If **this** occurred and needs were being met at the level **they** were before, one would not expect to observe an increase in preventable admissions or costs of care. Assessing local providers’ changing willingness to serve vulnerable populations is an important dimension to understanding the effects of program and policy changes. Such an approach should take into consideration the fact that the majority of CHC users rely on other sources of primary care in addition to **CHCs**.⁸ Thus, current patterns of health care utilization would have to be taken into account in drawing conclusions about the response of other providers to CHC downsizing.

II.C.3. Interim Measures for Maternal and Child Health

The MCH block grant program funds state and local activities to improve the health of pregnant women, infants, and children. Though some health services -- prenatal care, immunizations, and services for children with special health care needs -- are directly provided with MCH funds, the main focus of the program is to promote the integration, effectiveness, and accessibility of MCH care across the range of **providers**.^d Program dollars to this end are used to support training and research on MCH issues, foster cooperation among different health and social services organizations, promote the development of accessible and culturally sensitive care, and fund health promotion and disease prevention activities directed at the community. In essence, the program attempts to strengthen the health care infrastructure for women and children.

Two of the most important objectives of the MCH program are to reduce infant mortality and to promote healthy childhood development. The former will be discussed in the next section

^d Approximately 25 percent of state MCH program dollars are used for direct services.

in an empirical context to ascertain what data are available and what more are needed for full application of the model. For the latter objective of healthy childhood development, interim **measures** will be considered, since the data limitations are, at present, much greater than those **associated** with infant mortality.

Though many factors play into the growth and development of children, one input is **health care, including** well-child care. State MCH programs work with Medicaid EPSDT and **health** departments to ensure that children have access to this care. An essential component of well-child care is vaccination against childhood diseases. One could in most cases assume that if a child were properly vaccinated, he or she would have had adequate contact with health care providers. Immunization levels could, thus, serve as an interim measure of the success MCH programs have in bringing children into the health care system. The ultimate outcome remains healthy and well-developed children, yet rather than attempt to evaluate this with limited data, immunization levels could be a proxy for the adequacy of children's contact with the health care system.

In the context of the model, the dependent variable or outcome of interest selected might be the percentage of children by age 2 who are adequately immunized. Alternatively, the dependent variable could be the incidence of childhood diseases that are preventable by **immunization**. Tracking changes in these variables over time could highlight the impact of cuts in MCH block grants to states. All other things equal, a decline in immunization rates would be expected if MCH funds for well-child care and outreach were cut. Once more, other transformations in the health services environment would have to be taken into account to better assess the actual effects of MCH cuts. For one, if Medicaid is converted to a block grant

program, states may not offer EPSDT. Additionally, many children may no longer qualify for Medicaid. As a result, immunizations may become less accessible, regardless of whether MCH funds are reduced. By contrast, if more Medicaid families are enrolled in managed care plans which generally stress preventive measures, then immunization levels may rise.

Given the possibility of future changes in MCH and Medicaid funding, local health departments, which traditionally have provided free or subsidized immunizations and well-child care, should be monitored. Data are available from a **triennial** survey (National Association of County and City Health Officials) with a two year lag. Devising a survey to obtain more regular and timely information is highly desirable. Health departments may witness an increase in demand for immunizations if Medicaid enrollment declines or EPSDT is abandoned by states. The increase in demand could warn of strain in the system, perhaps suggesting a need for additional MCH funds to support local health departments.

III. Empirical Application of the General Model

Assessing the impact of programs administered by HRSA on health can be difficult given the myriad other influences on health status. For the same reason, analyzing the effect of potential reductions in these programs and in other public spending such as Medicaid, Aid for Families with Dependent Children (AFDC), and Supplemental Food Program for Women, Infants, and Children (WIC) is a complex undertaking. The conceptual model described in Section B.A. provides a framework for such an analysis, but the data required for a flawless evaluation do not now exist. Interim measures, such as those discussed above, often must be relied upon instead.

Nevertheless, to demonstrate the full application of the framework, this section will discuss how one **might** structure a comprehensive evaluation of the **prenatal component of the MCH program** and its interactions with other public and private sector services and providers. Shortcomings caused by incomplete data and strategies to overcome them will be discussed, as well. The framework developed in this concept paper is necessarily in its earliest development phase, and **modifications** will need to be made as feedback and experience is garnered from its **early** applications. Still, merely thinking through how to apply the framework serves to highlight target areas of data collection that may have high value in any future evaluation efforts that HRSA or other public health agencies may undertake.

III.A. Maternal and Child Health: The Linkage between Prenatal Care and Birth Outcomes

Because of the multifaceted nature of the MCH block grant program, defining and **quantifying** program activities is **difficult**. Thus, linking the program (and any cuts in the program) to specific outcomes poses a daunting challenge. The closer the activity (cause) is to the outcome (effect), with fewer opportunities for other factors to intervene, the more confident one can be that the two are linked in a causal relationship. Low birth weight is an example of an outcome that is relatively strongly associated with the delivery of comprehensive prenatal care, at least in the clinical literature. We will use this outcome as the target variable (dependent variable) for the model as applied to prenatal care delivered by the MCH program, **WIC**, Medicaid, and other programs.^c

^c Given the disparities in these measures across racial and ethnic groups, a variant of this approach is to use reduction in the gap as the outcome of interest.

Birth weight and many other characteristics of the mother and infant are available at the individual level from birth certificates, which are compiled in the National Birth Registry, or natality files, by the National Center for Health Statistics. Though a rich source of data, the natality files have certain limitations, particularly in regards to socioeconomic variables and health and social services received. MCH data developments in the states of South Carolina and Illinois offer promising new prototypes of a management information system to link numerous data sources. Both states have taken important steps toward linking data from the full gamut of health and social services agencies, including WIC, Medicaid (e.g., scope and content of case management), Department of Social Services (e.g., AFDC and Food Stamp status), and Departments of Mental Health and Substance Abuse. The South Carolina management information system also links the mother to characteristics of the census tract in which she resides, such as income and housing. The data base includes vital statistics as well.

Though the evidence is somewhat mixed, *comprehensive* prenatal care that addresses *common risk factors* is generally found to produce better birth outcomes, specifically in terms of birth weight. Many, though not all, researchers have found that prenatal care is particularly effective for high-risk women, including black women, who are twice as likely as white women to deliver a low birth weight baby.” (Note that evidence to the contrary has been found by others.)” Comprehensive prenatal care entails a range of services provided by the MCH program, Medicaid, WIC, and other programs. The analytical model should attempt to capture all of these inputs to the birth outcome for the sake of monitoring ramifications of cutbacks in the programs.

Though the ultimate birth outcome of interest is generally considered to be a reduction in the infant mortality rate, infant mortality and birth weight are so highly correlated that it is

reasonable to assume that birth weight is a proxy for infants' chances of survival. Birth weight is preferable to infant mortality as an outcome of interest because it is entirely affected by what occurs in the prenatal stage, including the efforts of MCH and other programs. Infant mortality, on the other hand, is amenable to care received in the post-natal period, such as neonatal intensive care. In addition, birth weight is a desirable outcome of interest because it is a good predictor of healthy childhood development. Those children born prematurely or too small more often face physical and mental developmental problems than do other children.

Health Status as a Component of the Model. Birth weight is a function of both the initial health status of the mother at conception and the health and social services received during pregnancy. **In** order to assess the impact of health and social services on birth weight using an econometric model, one must control for the health-related characteristics of the mother. If the unit of observation were the individual birth, one would want to include the presence or absence of medical risk factors in the model, such as diabetes, hypertension, anemia, and previous poor birth outcomes. Health conditions, in turn, are a function of those elements outlined in the general conceptual model. These include heredity, the environment, behavior (e.g., drug use including tobacco and alcohol and safe sex) and the many factors that influence behavior (e.g., education, income, and culture). Finally, health conditions are affected by previous use of health care, which, **in turn**, is influenced by ability to pay. Many of these variables or proxies for them are available in the natality files. Other socioeconomic variables at the census-tract level, such as income, could in the future be linked to the individual in a composite administrative data base, as is currently being undertaken in South Carolina.

The general **endogeneity/simultaneity** problems of the behaviors described above have led **most** analysts to adopt the county as the unit of analysis and the percentage of low birth weight **births** as the outcome (dependent variable) of interest. County-level measures of income and **many** other demographic variables (e.g., race, percent in poverty) **are** available. To control for those personal **characteristics** that are not generally available, analysts have constructed panel data sets (observations for the same set of counties over multiple years) and used fixed-effects estimation **procedures**¹² to construct county-specific dummy variables. This technique has the effect of accounting for county-specific differences in environment, average health status, and behavioral norms without requiring expensive attempts to measure the differences precisely.

This **fixed-effects** “solution” to the problem of unmeasured heterogeneity in behavior is not without cost. First, the technique may have limited power to estimate the effects of policies that either change very little over time or change similarly over time across areas. Second, **fixed** effects techniques require that multiple years of data on each variable be available for each unit of analysis (county). This may be problematic for some HRSA programs at present, but it may be worth setting into motion the data collection apparatus so that the fixed-effects technique can be used in the future. These program and county-specific data could be a by-product of the current Government Performance and Results Act (GPRA) initiative, for example.

Health Services as a Component of the Model. Having controlled for initial health status of the mother and its associated behaviors and influences, we turn to the second main influence on health outcomes--health services, which in this case is prenatal care. The receipt of prenatal care hinges on perceived health status, service processing capacity, the ability to pay, and **accessibility** of providers. Prenatal care, as an independent variable in the model, can be defined

by the number of visits and the gestational stage during which care was initiated (both of which are reported to the National Birth Registry System). The Kessner Index incorporates these two elements in a single measure- of the adequacy of prenatal care.¹³ Ideally, one would want to employ a measure of the content of prenatal care, since not all components of prenatal care are effective in increasing birth weight.¹⁴ Smoking cessation and increasing the mother's weight are two of the most important activities." Thus, it is important that the analytical model capture those services provided outside the realm of traditional medical care, including WIC food supplements.

One practical alternative measure of prenatal care for the purposes of the analytical model is dollars spent by the various programs. This approach could theoretically provide not only a measure of direct services received but also allows one to incorporate enhancements to service processing capacity. Service processing capacity refers to the ability of women to seek out and benefit from prenatal care. The literature strongly suggests that reducing financial barriers to care is not sufficient on its own to affect health outcomes. Numerous studies have concluded that increasing financial access to prenatal care (e.g., through Medicaid enrollment expansions) has not substantially improved prenatal care use or birth weight.¹⁶ Social infrastructure supports appear to be necessary as well. The MCH program and other public programs play a central role for vulnerable populations in ensuring that women obtain prenatal care, through outreach, coordination of care, and transportation activities. These diverse activities are difficult to define for use in the analytical model. Thus, a reasonable option is to use the annual funding level for such activities in the county, on a per capita or per client basis. Funding for each program could

enter the model separately in order to isolate the effects of each, particularly in the wake of any substantial cuts in a given program.

One should also include in the model a variable on direct spending on prenatal health services not funded by MCH dollars. This information is potentially available for Medicaid recipients and can be aggregated to the level of the county. For others, the effect of direct personal expenditures will have to be subsumed along with all the other county-specific variations into the county-specific intercept terms of the fixed-effects empirical model.

Ideally, application of the conceptual model to birth outcomes requires states to track the full range of services provided to expectant mothers, as is currently being done in South Carolina and Illinois. These services, measured at the county level in dollars per capita, act as the “treatment” variables, which can be tracked over time and compared with a baseline level of spending to determine their impact on low birth weight. Changes in Medicaid eligibility, which could affect access to prenatal care, could be controlled for in the model by using percent of poor and near-poor pregnant women covered by Medicaid within a county. This measure would require county-specific Medicaid enrollment counts from state program data.

A final set of independent variables to include in the model relates to the availability of health care providers willing to treat MCH clients. Various practitioner- or health resource-to-population ratios of the county are readily available from HRSA’s Area Resource File (overall physician/population, primary care physician/population, hospitals beds/population, etc.). More specific variables, such as the percentage of providers who accept Medicaid or uninsured patients, would be more difficult to collect over time, but the AHA and AMA survey data mentioned in Section II at least provide a starting point. The number of outpatient departments and emergency

rooms is also easily measurable, as is the number of NHSC personnel in the county. More problematic is the subtle but important relative private sector payment rates; but, as discussed above, this could be proxied by the relative importance of reported uncompensated care to hospital revenue. Health professional variables interact with MCH programs and other public services in the production of birth outcomes. Thus, in order to understand the impact of public dollars on low birth weight, one must control for changes in provider capacity, particularly primary care practitioners, in the model.

The predictors of birth weight, categorized broadly as initial health status and health services received, provide an analytical tool that could be applied to monitor changes in HRSA funding as well as cuts in Medicaid and other federal health care spending over time and place. By incorporating the many influences on birth outcomes, the model allows one to determine how & changes in a given variable affect health, independent of other factors, at least to a first order approximation. Defining MCH and other public program activities in terms of dollars for purposes of the model allows for a more direct link of funding to the outcome of interest, birth weight.

IV. Summary and Conclusions

This report has described and developed a framework for evaluating the impact of public health programs on the health outcomes of vulnerable populations. Evaluating such programs rigorously is an analytically ambitious task, and currently available data do not permit wholly satisfactory inferences to be drawn. Yet the need to enhance the precision with which evaluations of public health programs are done is exceptionally compelling now for two reasons:

(1) budgetary pressures are intense and likely to remain so and (2) proposed Medicaid cutbacks **could** significantly increase the need for a stronger public health infrastructure. Public sector resource allocation decisions in these areas are being made without satisfactory analysis at the present time.

This concept paper has sketched a framework that can explain the difficulties of establishing definitive causation as well as highlight the areas with the greatest need for improved **and** refocused data collection. Applications of the framework also suggested interim measures for assessing the upcoming Medicaid cutbacks, reductions in funding for health centers, and reductions in funding for maternal and child health programs. Gathering these data consistently across the nation should become a high priority for monitoring the evolution of the health care delivery system in general and the public health infrastructure elements of it in particular.

Understanding the linkages among the public health infrastructure and other components of our delivery and financing systems is crucial to interpreting the measures that we can observe.

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APPENDIX A

VULNERABLE POPULATIONS

In considering the impact of HRSA-sponsored programs, it is helpful to begin with a clear **understanding** of the people who are the primary target of the agency's efforts. The programs **administered** and funded by HRSA address the health needs of those who are, in general, most likely to require care and yet for various reasons are unable to obtain it. In 1990, it was estimated that 42.8 million persons were medically underserved because they lacked health insurance, lived in areas with inadequate health resources, or had special health or social needs not well-served by conventional health care providers.¹ Perhaps the single underlying characteristic that best distinguishes these individuals is their lack of material resources, or their impoverishment. In 1994, 14.5 percent of the U.S. population, or 38 million people, lived under the federal poverty line, which was defined as \$15,141 in annual income for a family of four. The poverty rate among blacks and Latinos (of any race) was twice as high as the overall U.S. rate, at slightly more than 30 percent. Among children under age 18 of all races, 21.8 percent fell below the federal poverty **line**.² Similar to the general population, black and **Latino** children were more than twice as likely as white children to live in **poverty**.³

A significant body of literature on the relationship between socioeconomic characteristics and health status finds that poverty is an important predictor of illness and early death. This relationship holds even when health care is seemingly accessible, either through insurance coverage or, in the case of Great Britain, through the National Health **Service**.⁴ Within the U.S., **the poor** experience a rate of death from all causes combined that is twice as high as that of the

non-poor.⁵ For low-income children, the death rate is three times higher than that for other children.⁶ Explanations for the disparity in health status between low and high socioeconomic groups include differences in use of preventive services, behavioral risks, and exposures. The relative importance of each of these factors and how they ultimately contribute to early mortality remains ambiguous.⁷ Moreover, correlations between poverty and illness typically cannot distinguish between whether the onset of illness led to poverty or vice versa.

Despite the less favorable health status of the poor, it is these individuals who on average face the greatest difficulties securing basic health care, whether due to a lack of money, transportation, or familiarity with the health care system. According to National Medical Expenditure Survey (NMES) data from 1987, 75.6 percent of persons below the federal poverty line had any use of health care services compared with 85.2 percent of the middle-income population and 89.0 percent of the high-income population. The expenditures per user for the poor, however, were much higher than for middle- and high-income groups: \$2,024 versus \$1,268 and \$1,405, respectively.* These statistics indicate that although the poor are less likely to use health services: when they do, they require more intensive care than the non-poor. Results from the 1993 National Health Interview Survey (NHIS) support the notion that health care use and expenditures for the poor is very skewed. The NHIS found that those with a family income of less than \$14,000 had 7.3 physician contacts per year compared with 6.0 for the U.S. population as a whole.⁹ This suggests, again, that although the poor are less likely to use health services, those who do require a significant amount of care, raising the average number of encounters for the poor as a whole.

The physician contacts reported by the poor often do not take place in an appropriate **setting** with a provider familiar with their medical history. Many low-income persons have no **feasible** alternative for health care but the hospital outpatient department. A survey of more than 950 physician practices in 10 cities found that only 34 percent of private physician offices would **make an appointment** for a Medicaid patient.” The **NHIS** also found that low-income patients were more likely to rely on a hospital for physician services than were the wealthy. For those earning \$50,000 or more as a family, 63 percent of physician contacts occurred in a doctor’s **office** and only 10 percent in a hospital outpatient department (including the emergency room). In contrast, 43 percent of physician contacts by those with a family income less than \$14,000 were in a doctor’s **office** while 19 percent were in a hospital outpatient department or emergency room.”

The relationships between poverty, health status, and health care utilization are complex. **In** order to better understand what makes certain people--primarily the poor--susceptible to excess morbidity and mortality and access barriers, vulnerable populations will be discussed in terms of their insurance status, geographic location, instability of residence, and cultural/linguistic barriers. Those with special health care needs will also be described. There is much overlap between these classifications, **with** many individuals falling into multiple categories. For the sake of clarity, these groups will be described in mutually exclusive terms.

Insurance status

A key factor determining whether an individual can secure adequate health care is his or her ability to pay. For those who do not have health insurance to defray some of the costs, **medical** care can be prohibitively expensive. Though 40 percent of the uninsured report they do

not have enough money to pay their medical bills,¹² the provision of uncompensated or publicly subsidized care ensures that many obtain necessary services. Yet market and public-sector forces to reduce health care spending are limiting the ability of providers to deliver charity or subsidized care. Medicaid recipients, too, often encounter **difficulties** obtaining health care because the rates paid by most state programs fall significantly under the payments of private insurers and Medicare, making Medicaid patients less attractive to **providers**.¹³

The Uninsured. In 1994, more than 17 percent of the U.S. population under age 65, or 39.7 million people, were uninsured.¹⁴ This percentage has been rising since at least 1980, when 12.5 percent of the nonelderly population had no health insurance.” This trend can largely be attributed to a decline in private insurance coverage, as fewer employees are able to afford their share of the premium and fewer employers are offering or subsidizing coverage for employees’ dependents.¹⁶

A lack of health insurance is most common among the poor. According to the **NHIS**, of those families earning less than \$14,000 in **1993**, **35** percent were uninsured compared with 5 percent of those with family incomes at or exceeding **\$50,000**.¹⁷ Though frequently poor, most of the uninsured are workers or dependents of workers: Only 15 percent of uninsured families had a head of household that did not work at all during the year.* The general decline in the prevalence of private insurance coverage has been particularly dramatic among the poor. From 1980 to 1993, those earning less than \$14,000 who were covered by private insurance fell from 39 to 26 percent. Expansions in Medicaid eligibility rules compensated for this decline and led to a higher percentage of the poor being covered by Medicaid. On balance, the proportion of the poor who

are uninsured actually has fallen since 1989.¹⁹ The Urban Institute, using the Current Population Survey, found comparable trends in insurance coverage.²⁰

The uninsured use health services less frequently than the insured population, are less likely to have a usual source of care, and are less likely to receive preventive care.²¹ The NMES found that 64 percent of the nonelderly population who were uninsured for all of 1987 used any health service compared with 84 percent of the overall population. For those uninsured who did receive care, the average annual expenditure was \$915 versus \$1,420 for the non-elderly population as a whole.²² According to another study, uninsured adults have only 61 percent as many ambulatory contacts as insured adults and only 67 percent as many hospital days. The disparity is even greater for the subset of those who are in fair or poor health. Uninsured children, on the other hand, are somewhat more in line with their insured counterparts. Their ambulatory contacts equal 70 percent of the insured population's, and their relative use of hospital days is 81 percent. As with adults, it is those in fair or poor health who display the most contrast: Uninsured children in fair or poor health have ambulatory care visits that total only 55 percent of the average number of visits by insured children of the same health status and 49 percent of the number of hospital days.²³

Another study reports that the uninsured who are either chronically ill or healthy are half as likely to see a physician as the insured. For the acutely ill, the uninsured are two-thirds as likely to see a physician as the insured. Thus, it appears that lack of insurance is less of an inhibitor to seeking care in situations requiring relatively immediate medical attention.²⁴

The utilization data reported here highlights considerable disparities between the insured and uninsured. Some would argue, however, that the uninsured **are not** seriously underserved, rather the insured receive a significant amount of unnecessary care.

Medicaid. Medicaid, the joint federal-state health insurance program for the poor, covered 32.1 million persons in 1993. In addition to covering the elderly and disabled who qualify for Supplemental Security Income and those receiving Aid for Families with Dependent Children (**AFDC**), states are mandated by federal law to cover pregnant women and children up to age 6 with incomes at or below 133 percent of poverty. States must phase in coverage of children until all up to age 19 and below poverty are covered. In 1993, children comprised 50 percent of total recipients but accounted for only 15 percent of total expenditures. Low-income adults-- primarily women receiving **AFDC--comprised** 23 percent of the Medicaid population and were responsible for the same amount of expenditures, 23 **percent.**²⁵

Though Medicaid was established to provide financial access to health services for **low-** income populations, only 51 percent of those under 150 percent of poverty were covered in 1993, compared with 65 percent in 1976.²⁶ Even those who qualify for Medicaid benefits are not entirely immune to the access problems faced by the poor and uninsured. A study using NMES data found that Medicaid recipients reported access problems at the same rate as the uninsured--a **rate** twice as high as that of the insured population. Based on a sample of Medicaid recipients, **the authors** estimated that about 1.2 million were unable to obtain medical care for various **reasons** at some point in 1987.²⁷ Nonetheless, 83 percent of publicly insured persons under age 65 (primarily Medicaid patients) had some use of health care during 1987, nearly equivalent to the 87 percent of privately insured persons who **did.**²⁸ Given that the Medicaid population is

generally in poorer health than even the uninsured, some argue that they require more care than other **groups**.²⁹ In fact, the publicly insured non-elderly who do receive care report, on average, twice as high an expenditure as the privately insured: \$2,619 versus **\$1,316** in **1987**.³⁰

Geographic Location

Some populations are particularly vulnerable to medical underservice because of where they live. Inner-city and remote rural areas, in particular, are characterized by a scarcity of **primary** health care resources. Poverty plays a significant role in the limited availability of health care services in these geographic regions. The rural poverty rate is 16.8 percent; central city, 20.5 percent; and other metropolitan areas, 9.7 **percent**.³¹

As of June **1995**, **26.7** million people in metropolitan areas and 22.8 million people in nonmetropolitan areas lived in designated health professional shortage areas (**HPSAs**) where the *population-to-primary care physician ratio is 3,500 to 1 or higher. A total of 5,495 primary care physicians are necessary to remove all HPSA designations and even **more--12,270--are** needed to achieve the target ratio of **2,000** to 1.³² The age-adjusted death rates for rural and central-city areas demonstrate that a lack of physicians in these areas is not for want of illness. The rate for rural areas in 1991 was 525.3 per 100,000 and 549.4 per 100,000 for central cities compared with 504.5 per 100,000 for the U.S. as a whole.³³ The following provides additional details on the conditions in these areas. In a later section, the health care resources of rural and inner-city areas are discussed.

Inner-cities. Over the last half of this century, major U.S. cities have experienced a growing concentration of poverty and violence in their urban core and increasing racial

segregation. Residents of the urban core have become more socially isolated from the middle- and working-class individuals who have departed for outlying towns and suburbs. Those **remaining** in the central-city districts tend to be poor minorities, usually blacks and **Latinos**.³⁴ poverty is pervasive in the inner-city, exceeding that of metropolitan areas as a whole and nonmetropolitan areas. A myriad of societal ills in some manner contribute to or stem from poverty in the inner-city: homelessness, unemployment, crime, teenage pregnancies, single-parent homes headed primarily by females, crowded and unsafe housing, and high school dropouts. Many of these sociological problems have bearing on the health status of inner-city residents. Based on a weighted average of death rates in the top 20 largest cities in the U.S., large metropolitan areas have notably higher rates of death (compared with the U.S. as a whole) from tuberculosis, syphilis, infectious and parasitic conditions (including HIV), hypertension, chronic liver **disease/cirrhosis**, complications of pregnancy, and homicide. Infant mortality rates are extremely high as well.

Rural areas. In comparison with metropolitan areas as a whole--both central cities and surrounding **suburban** areas--rural America is somewhat more elderly and impoverished. While the elderly **comprise** 10.3 percent of the metropolitan population, they account for 13.8 percent of the nonmetropolitan population. Furthermore, rural areas, with only 22 percent of the population, contain 26 percent of the nation's **poor**.³⁶ Health indicators of rural residents reflect that which is generally associated with a more financially disadvantaged and aged population--poorer health status. For example, the rate of chronic disease in the rural population is 14.9 percent versus 12.6 percent in the metropolitan population.³⁷ Nonmetropolitan residents, despite their poorer health status, had somewhat fewer physician contacts than did their metropolitan counterparts in 1993:

5.6 versus 6.1. In addition, 80 percent of metropolitan residents had seen a physician in the past year compared with 77 percent of the nonmetropolitan population.³⁸

Unstable Place of Residence

Another group of people who face unique challenges in obtaining needed health services is those who lack a permanent place of residence. Almost by definition these persons are poor and have many of the disadvantages discussed previously, in addition to others related to their unstable lifestyles. Migrant workers and the homeless fall into this category of vulnerable persons.

Migrant and seasonal workers. Although it is difficult to know precisely how many migrant and seasonal farm workers and their dependents travel and work throughout the U.S., estimates place the number between 4 and 5 million.³⁹ Migrant and seasonal farm workers commonly work and live in unsafe conditions. They are frequently exposed to occupational hazards such as pesticides, heavy farm equipment, and excessive heat. Their temporary living arrangements are often poorly constructed, crowded, and lacking municipal sanitation services. Moreover, the disruptive nature of the work cycle and the frequent relocation lead to discontinuity in the receipt of health care services.⁴⁰ The availability of health services is essential to migrant farm workers and their dependents given the unhealthy and unsafe conditions they experience. Agricultural workers, in fact, have a work-related death rate twice that of all occupations--10.6 per 100,000 compared with 5.2 per 100,000 in 1990.⁴¹

The **Homeless.** As with the migrant population, counts of the number of people who are homeless are difficult to obtain. One estimate ranges from 2 to 3 million homeless and 5 million

at risk of losing their **home**.⁴² The fastest growing homeless population is families with children, comprising 39 percent of the homeless in 1994. Homelessness continues to grow, with 30 cities reporting an average one-year increase of 21 percent in the number of persons requesting emergency shelter in 1994.⁴³

The homeless are **exceptionally** susceptible to certain diseases, such as tuberculosis and other chronic conditions, and have high rates of substance abuse, mental illness, trauma, and death. Alcoholism and substance abuse are nine times as prevalent in the homeless population compared with the general population. It is estimated that 30 to 40 percent of the homeless abuse alcohol, 10 to 15 percent use illicit drugs, and 25 percent suffer from a mental illness. AIDS is also widespread, afflicting as many as 15 percent of the homeless population. Concentrated in large cities, the homeless tend to rely on metropolitan hospital outpatient and emergency departments for their health care and other **needs**.⁴⁴

Racial/Ethnic/Linguistic Barriers

Ethnic and racial minorities at times confront special hardships in gaining access to appropriate health services. The barriers they encounter are often related to poverty but may also stem from provider attitudes and prejudices and difficulties in communicating. For these reasons, securing a usual source of care in an appropriate setting can be problematic for some. Many black patients seek care at hospital outpatient and emergency departments--24 percent of physician contacts for blacks were in this relatively costly setting in 1993 compared with 12 percent for **whites**.⁴⁵ This pattern of use may be partly due to the high percentage of uninsured among the black population who have few alternatives but the hospital when in need of care. Twenty-three

percent of black people were uninsured in 1993 compared with 16 percent of white people.

Persons of Hispanic origin had the highest rate of uninsurance, at 34. percent.⁴⁶

People with limited English language skills also face barriers to receiving appropriate care. Because much of the success of medical diagnosis and treatment depends on effective communication between patient and provider, language differences can lead to less than satisfactory outcomes. One study comparing the care received by English versus Spanish speakers found that more complete Care **was given** to those who spoke English, **controlling** for Hispanic ethnicity. ⁴⁷

According to the 1990 census, 14 percent of Americans were not native speakers of English, a 38 percent increase from the 1980 census. Some states had even higher percentages of non-native speakers of English: **New** York, 23 percent, California, 32 percent, and Texas, 25 percent.⁴⁸ The growing number of persons with limited knowledge of the English language is reflected in the heightened demand for interpretation services by health care **organizations**.⁴⁹

Maternal and Child Health

Pregnant women and children at high-risk due to poverty or poor health are a particularly vulnerable population to whom many public health care resources have been directed. The priority that pregnant women and children have is reflected in their low rate of uninsurance despite their high rate of poverty. Though 16 percent of pregnant women and children under 200 percent of the federal poverty line were estimated to be uninsured in 1993, their rate of uninsurance is nevertheless half that of the general population under 200 percent of poverty. ⁵⁰

Medic&d is largely responsible for this relatively broad coverage of pregnant women and children.

In addition to Medicaid's efforts, HRSA's MCH Bureau directs countless dollars into developing preventive and primary health care programs for women and children.

Pregnant women. A driving force behind the efforts to ensure adequate health care to at-risk pregnant women is the excessive infant mortality in the U.S. Although the rate has been gradually declining, from 10.9 per 1,000 births in 1983 to 8.5 per 1,000 births in 1992, it remains higher than most other developed countries. Moreover, for black Americans, the rate, at 17 per 1,000, is more than double that of their white counterparts.⁵¹ This rate is nearly equivalent to that of Sri Lanka, the Ukraine, and Chile.⁵² Low birth weight, defined as under 2,500 grams, is the main contributor to infant mortality, particularly neonatal mortality, which is death within the first 28 days of life. Underweight babies who survive are more prone to developmental impairments, especially brain injuries, than are other children.⁵³ While the infant mortality rate has been falling, in part because of improved neonatal intensive care, the incidence of low birth weight has been on the rise, from 6.84 percent in 1980 to 7.08 percent in 1992. The low birth weight rate for white women and Latinos is approximately 6 percent while that of blacks is double, at 13 percent.”

Teenagers are particularly at risk for delivering low birth weight babies.” The birth rate among females 15 to 19 years of age rose from 53 per 1,000 teens in 1980 to 61 per 1,000 teens in 1992. The disparity between white and black teenagers is striking: 30 per 1,000 for whites versus 112 per 1,000 for blacks in 1992.⁵⁶

There is evidence to suggest that timely and comprehensive prenatal care can increase birth weight. Yet many women do not receive adequate care. The percent of women initiating prenatal care in the first trimester has been rising, from 76.3 to 77.7 percent over the period 1980 to 1992; however, minority women still lag far behind white women. White women are much

more likely to begin care in their first trimester (81 percent) compared with black and Hispanic women (both at 64 percent).⁵⁷ The percent of women who are on Medicaid or uninsured and do not receive adequate prenatal care is comparable to that of minority women--63 percent according to a 1987 study of eight states. The two main barriers to care reported were lack of money and lack of transportation."

Children. Healthy infant and child development depends on many factors in addition to appropriate prenatal care. The lifestyle the mother-to-be leads, the conditions in which the child is raised, and the health care he or she receives all play a role. A significant contributor to poor birth outcomes and subsequent developmental problems is substance abuse by pregnant women. One estimate is that 2.2 percent of babies in the U.S. are born to drug abusers.⁵⁹ Another estimate places the figure at 8 percent, based on the number of women of childbearing age who report drug use.⁶⁰ Beyond the perinatal period, a major factor that adversely affects children's health is poverty. Children in poverty are more likely to be sick than other children. They are exposed to more environmental hazards, lead less healthy lifestyles, and have more restricted access to care. These circumstances reveal their impact in the elevated number of hospital days for low-income children. Based on national data, children in families with incomes less than \$20,000 had 60 percent more hospital days than other children.⁶¹

Another important contributor to infant and child health is immunization against preventable diseases such as diphtheria and measles. Immunization levels in the U.S. are quite low: In 1993, for a sample of respondents who consulted their records or reported no vaccinations, only 60 percent of children 19 to 35 months of age had received the recommended series of immunizations. For black children, the rate was much lower--49 percent, and for those

below poverty the rate was 50 percent. In terms of geographic location, central city residents had the lowest rate, followed by nonmetropolitan areas, and suburban areas.⁶²

Although most children require no more than well-child care, including immunizations, to ensure healthy development, there are others who due to chronic illness or disability need more intensive services. It is estimated that 10 to 30 percent of children (under age 18) have a chronic health problem that endures for at least three months, ranging from asthma to cerebral palsy. Though in most cases the condition is not debilitating, about 5 percent of chronically ill children suffer from a disability, which on average results in twice as much use of basic ambulatory services and four times as much use of inpatient services and allied health professional services compared with nondisabled children.⁶³

Disabilities

Disabled adults, like disabled children, require considerably more health services than the non-disabled population. In 1991-92, some 24 million Americans were considered severely disabled, that is, physically or mentally impaired to such an extent that their daily activities were "very restricted."⁶⁴ Predominant causes of disability include arthritis, spinal cord injury, and mental illness.⁶⁵

The disabled are more likely to be unemployed or under-employed and, consequently, more likely to be poor. In fact, the poverty rate for the disabled is three times that of the able-bodied. Expressed another way, more than one-fifth of all persons between the ages 18 and 64 living in poverty report having a disability. The combination of limited personal resources and

Significant health care needs creates hardship for many of the disabled when attempting to obtain health services.⁶⁶

AIDS/HIV

The increasing prevalence of acquired immunodeficiency syndrome (AIDS) as a result of infection by the human immunodeficiency virus (HIV) continues to take its toll in terms of lives lost and strained public health care resources. In 1994, there were 80,691 new cases of AIDS reported, lower than the 106,618 reported in 1993 but much higher than the 47,572 in 1992. The cumulative number of people living with AIDS or **HIV** in the U.S. as of December 1994 was 231,037. Of these, 3,850 were children younger than 13 years **old**.⁶⁷ Some experts assert that the number of reported AIDS cases represents only a fraction of the number who are HIV positive **but asymptomatic**.⁶⁸

In the initial years of the AIDS epidemic, white homosexual males comprised the majority of AIDS victims. In more recent years, the demographics of the AIDS population has changed. In 1992, while AIDS was the eighth leading cause of death for the nation as a whole, it was the fourth leading cause of death for black and **Latino** males. The death rate rose from 8.4 to 18.1 per 100,000 among white males from 1987 to 1992 and from 25.4 to 61.8 per 100,000 for black males. For white females, the rate increased from 0.6 to 1.6 per 100,000 and for black females, from 4.7 to 14.3 per **100,000**.⁶⁹ Based on more current data, 53 percent of all male cases of AIDS reported in 1994 were among blacks and Latinos. Among women, 57 percent of cases were black individuals and 20 percent were Latinos. Overall, AIDS incidence rates are six times higher for blacks than whites and three times higher for Latinos than whites.”

The care required by persons with AIDS can be very expensive. Because most persons with AIDS do not have health insurance, much of the financial burden of treating these patients falls on public providers." Both public and private institutions and practitioners who provide care to AIDS patients frequently incur large sums of bad debt related to their AIDS admissions.

Substance Abuse

Substance abuse has ramifications for both societal welfare and for personal health. The abuse of legal and illegal drugs alike is pervasive in the U.S., resulting directly and indirectly in excess morbidity, mortality, crime, unemployment, and poverty. Around 12 to 18 million Americans are alcohol abusers. As for illicit substances, 5 million report use of marijuana at least once a week, 2 million are cocaine addicts, and 750,000 are heroin addicts.⁷²

Though substance abuse treatment centers are best equipped to care for and rehabilitate addicts, often the **consequences** of drug abuse spill over into the sphere of primary health care. Myriad health care problems are linked to the use and abuse of alcohol, drugs, and tobacco products. Alcohol is **associated** with cirrhosis of the liver and fetal alcohol syndrome. Alcohol and illegal drugs **are** related to violent crime, motor vehicle accidents, poor birth outcomes, and cardiovascular disease. Moreover, AIDS is commonly spread through sharing needles used for injecting **heroin**.⁷³

APPENDIX B

THE HEALTH CARE INFRASTRUCTURE

Vulnerable populations, ranging **from** poor children to disabled elderly to inner-city AIDS victims, are in many respects more in need of health care services than the general U.S. population.. Yet appropriate treatment and preventive services are often inaccessible to them. Though the U.S. health care system abounds with specialized personnel and facilities as well as sophisticated equipment and therapies, basic health services may be out of reach for those most in need. Despite the gaps that exist, however, the numerous participants involved in creating a safety net for the poor have made strides in improving the overall accessibility of health care. The **health care infrastructure** for socioeconomically disadvantaged populations consists of a patchwork of programs and providers in both the public and private sectors. Many of these health care providers are supported by HRSA. This section will outline those providers who play a role in delivering health services to vulnerable populations, including hospitals, clinics, and practitioners.

Hospitals

Vulnerable populations rely on hospitals for not only tertiary care but also, in many cases, for primary care. A number of hospitals, in fact, serve as providers of “last resort” for the poor and uninsured who have no viable alternatives for basic health care services. Certain public and not-for-profit hospitals have assumed this role because of their location in primary care physician

rtage areas and because legally and ethically they have trouble turning any patient away, regardless of ability to pay.

In 1993, there were 5,261 nonfederal community hospitals, the majority of which were private not-for-profit with 65 1,000 beds. State- or local-supported facilities accounted for a total of 169,000 beds, followed by private for-profit hospitals with 99,000 beds. Hospital closures and bed reductions have become commonplace in the past decade as payer incentives have shifted more care into outpatient settings and reduced length of inpatient stays. In the decade from 1983 to 1993, the number of rural community hospitals fell from 2,713 to 2,249. Urban hospital closures were somewhat less common, with 58 closures by 1993 from a starting point of 3,070 in 1983.⁷⁴

Most concur that these hospital closures have had few adverse effects on the communities they served; rather, the closures have resulted in a more appropriate supply of beds. There are exceptions, however. For some rural areas, hospital closure may place residents a long distance from the nearest hospital. This is particularly a problem for the poor and elderly who are less able to travel to distant locations. For inner-city residents, closure of a neighborhood hospital may mean loss of an important source of ambulatory care for those lacking a regular provider. A survey of patients seeking ambulatory care in one urban public hospital concluded that 62 percent had no regular source of care.⁷⁵ In another study, it was found that 40 to 55 percent of all emergency room visits were non-urgent. Lack of a usual source of care was the most commonly cited reason for this.⁷⁶

Inner-city and rural hospitals, on average, are in a more precarious financial situation than are other hospitals. In 1993, 24 percent of all hospitals had negative operating margins. Large

Medicaid recipients in 1994. In this same year, more than 9 million persons were served by federally funded health centers. Most, 7.1 million people, were seen in C/MHCs, of which there were 627 grantees operating in 1,615 sites. Health care for the homeless projects served 420,000 patients through 129 grantees and 500 delivery sites, and 22 public housing clinic grantees served 110,000 persons.⁷⁷

As of 1992, these health centers received a substantial portion of their funding--an average of 41 percent--from federal grants. Other sources of funding included Medicaid (24 percent), Medicare (7 percent), patient fees (7 percent), and other third party payments (8 percent). The balance of their budgets was comprised of state, local, and other support, such as private grants and donations.⁷⁸

Health Departments

Like federally-funded health centers, city and county health departments are a vital source of primary care for populations at risk for underservice. Unlike health centers, however, health departments tend to have a more narrow focus rather than offer a broad range of primary care services. Health departments typically emphasize perinatal care, well-child care, family planning, and screening and treatment for sexually transmitted diseases. Health departments also devote more effort to needs assessments and program planning and development than do most C/MHCs.⁸¹ The MCH block grant program administered by HRSA supports many of these activities.

Though health departments have traditionally concentrated on preventive activities, more and more are providing personal health services as well. The following is a list of the percentage of health departments that provide or contract for various services.⁸²

Immunizations	96 %
Tuberculosis services	86 %
Health education	80 %
Well-child care	79 %
Early and Periodic Screening, Diagnosis, & Treatment	72 %
Sexually transmitted diseases (STDs) testing and counseling	71 %
Family planning	68 %
HIV/AIDS testing and counseling	68 %
Women, Infants, and Children	67 %
STD treatment	66 %
Prenatal care	64 %
Case management	44 %
HIV/AIDS treatment	33 %
Primary care	25 %

There are about 2,900 local health departments in the U.S., with eighty percent operating under a county **jurisdiction**.⁸³ These organizations are concentrated in rural areas and small towns; in fact, two-thirds of them have service areas of less than 50,000. Because health

epartments are arms of the local government, much of their funding--34 percent--originates at the local level. Another 40 percent of funds come from the state, which includes federal **pass-**through dollars such as MCH grant money. Direct federal sources amount to 6 percent; Medicaid, 7 percent; Medicare, 3 percent; patient fees, 7 percent; and private insurance, foundations, and other, 3 **percent**.⁸⁴ Most services are provided free of charge for those below a certain poverty threshold, and those patients above the eligibility line usually pay on a sliding fee **scale**.⁸⁵

A longitudinal study (1979- 1992) of 15 health departments uncovered some noteworthy trends. Over the study period, the selected health departments increased their reliance on nonphysician providers such as nurse practitioners and increased their reliance on patient fees. Even with an increase in **CHCs**, from six to 14 in the areas studied, the services the health **departments** provided increased over the study **period**.⁸⁶ In another study, health departments and **CHCs**, despite the overlap in their target populations, exhibited very few efforts to work together and coordinate activities. Of 1,800 health departments and 630 **CHCs** surveyed, only 36 meaningful collaborations **were in place**.⁸⁷

Other Clinics

In addition to health departments, **CHCs**, and other federally funded centers, there are numerous organizations in both the public and private sectors that serve indigent populations. These include prenatal clinics, family planning clinics, Ryan White clinics, school-based centers, free clinics, and Indian Health Service clinics. Some of these clinics are actually extensions of

Health departments and community health centers or have corresponding target populations and services.

Although local health departments are probably the most common providers of prenatal care funded through MCH grants, there are also numerous "stand-alone*" prenatal clinics. An estimated 2,306 prenatal clinics that received state funding, including those housed in local health departments, were in operation in the early 1990s.⁸⁸ As for family planning clinics, though many are under the direction of health departments, others, such as Planned Parenthood clinics, are private sector non-profit entities. Many family planning clinics receive federal funding through Title X of the Social Security Act. Ryan White monies, administered by HRSA, support stand-alone clinics as well, though they may also fund programs within, for example, health departments and **CHCs**.

School-based and -linked clinics, numbering more than 600 in 1992-93, have become increasingly popular in the past decade. School-based clinics operate on school grounds, whereas school-linked clinics are off-campus and generally serve multiple schools. These clinics provide primary medical care and counseling, and most address reproductive health issues. According to a recent survey in 1992-93, 59 percent of these clinics were located in urban areas, 29 percent were in rural communities, and 12 percent were in suburban locations. Nearly half were in high schools. Most were sponsored by health departments (26 percent), **CHCs** (19 percent), or hospitals (13 percent). Funding was a combination of MCH grants, Title X family planning grants, state and local funds, and Medicaid reimbursement. Twenty-eight percent of patients in the surveyed schools had Medicaid coverage, and 42 percent were uninsured."

Finally, scattered throughout the country are what are commonly referred to as “free clinics.” In the **1970s**, as many as 300 free clinics were providing care to those unable to pay. By the end of the **1980s**, this number had dropped to 100 clinics, serving about 1 million people. Some speculate that the proliferation of **CHCs** may have negated the need for free **clinics**.⁹⁰

Practitioners

The foundation of the health care infrastructure for the poor and otherwise vulnerable groups are the individual practitioners who staff the hospitals, health centers, health departments, and other clinics. Many in their own private practices also contribute significantly to meeting the needs of those at risk for being medically underserved. These practitioners include physicians, nurse practitioners, physician assistants, and certified-nurse midwives.

In 1992, there were 653,062 physicians, 82 percent of whom were involved in patient care activities. Forty percent were in the primary care specialties of family and general practice, internal medicine, pediatrics, and obstetrics/gynecology.⁹ Some assert that the nation has an excess supply of physicians overall and too few primary **care** physicians. Indeed, the physician population has been growing at a rate four times the general population over the past three decades. Though there is controversy regarding these claims, there is fairly broad-based consensus that, despite the large stock of physicians, geographic maldistributions exist. In 1992, only 11.6 percent of physicians practiced in rural areas where 22 percent of the population lives. Some of this imbalance is acceptable, as it is expected that rural residents will travel longer

⁹ The available statistics from the American Medical Association have certain medical subspecialists grouped under the category of internal medicine, including hematology, oncology, nephrology, and rheumatology.

distances to receive specialty care that is most appropriately delivered in high-volume urban facilities. It is the distribution of primary care physicians that is of most concern, since they practice medicine that is comprehensive enough to meet most of the needs in rural areas. In general, primary care physicians' practices are distributed more evenly throughout the country, though there remain shortage **areas**.⁹¹

Although many rural areas have experienced an increasing presence of physicians, these communities tend to have certain characteristics that make them attractive to physicians. A significant amount of physician migration has occurred in places with thriving economies, larger populations, and proximity to metropolitan **areas**.⁹² The most remote and poorest on the rural landscape continue to have **difficulty** recruiting and retaining physicians in their communities. For example, from 1975 to 1985, the nation's primary care physician-to-population ratio increased by 30 percent in the aggregate and 39 percent in **all** nonmetropolitan areas. In counties with fewer than 10,000 people, however, the growth was a mere 9 percent during this same **period**.⁹³ The outlook for the future is not entirely promising. A 1989 survey of graduating medical students found that 79.5 percent preferred to locate in an urban or suburban area compared with 65.3 percent in 1981.⁹⁴ Given rural areas' reliance on primary care physicians, specialty trends are also of some concern. In 1994, only 23 percent of fourth year medical students expressed a preference for primary care. Though low, this percentage represents a substantial increase over the 15 percent who desired to enter primary care in 1991.⁹⁵

Approximately 52,000 nurse practitioners and 26,000 physician assistants practice in the U.S.⁹⁶ Historically, these providers have had a greater propensity to locate in rural areas than have physicians. Nonphysician practitioners are also more likely than physicians to view a rural

practice as relatively permanent and one where they can best achieve their career goals.⁹⁷ Over time, however, these practitioners have shifted toward metropolitan settings. In 1988, 16 percent of nurse practitioners (including certified nurse-midwives) were in rural areas compared with 18 percent in 1984 and 22 percent in 1977.⁹⁸ Physician assistants, too, are expressing a greater preference for large communities. In 1981, 27 percent practiced in communities with less than 10,000 people; by 1992, this percent had fallen to 16.⁹⁹

Despite the concentration of physicians in metropolitan areas, residents at the very core of urbanized areas often face a shortage of physicians. Though many physicians are clustered in the central city, they are more likely to be specialists in a hospital-based practice rather than community-based primary care physicians.¹⁰⁰ As with rural areas, the poorest areas of cities are more likely to suffer such shortages.“

Who are the physicians who care for the vulnerable populations? The majority of physicians provide some amount of charity care, and this proportion is growing. Of physicians as a whole, 68 percent provided charity care in 1994, an increase of 6 percentage points since 1988. The average reported amount of bad debt for all physicians was \$37,500 in 1993.¹⁰² Physician participation in Medicaid as measured by at least 1 percent of practice revenues generated from Medicaid totaled 76 percent in 1990.¹⁰³ Earlier research suggests that Medicaid patients are concentrated in relatively few physician practices. In this particular study, 32 percent of Medicaid patients were treated by 5.5 percent of physicians.¹⁰⁴

Racial and ethnic minority health providers are more likely to practice in low-income areas than are other physicians. A disproportionately high percentage of office-based physicians who practice among the poor are black or Latino.¹⁰⁵ Minority enrollment in medical school has

increased in the past decade but is still not representative of the minority composition of the U.S.

In the school year 1980-81, 5.7 percent of medical students were **non-Latino** blacks and 4.2 percent were Latinos. In the school year 1992-93, enrollment rose to 7.0 percent and 5.8 percent, respectively.¹⁰⁶

Another important source of medical care for underserved populations is the National Health Service Corps. Since the early 1970s, the Corps, under the direction of HRSA, has placed more than 20,000 clinicians in designated health professional shortage areas and many directly in community and migrant health centers. In return for a scholarship award or loan repayment, members of the Corps serve in needy urban and rural areas for the equivalent length of time in which they received financial support. Physicians, nurse practitioners, certified nurse-midwives, physician assistants, and dentists are eligible to participate. The Corps reached the peak of its **total** strength in 1986 with 3,304 practitioners. Subsequent cut-backs in funding have reduced the Corps to 1,930 practitioners as of 1994. Of these, 61 percent were physicians, 14 percent were physician assistants, 12 percent were dentists, 9 percent were nurse practitioners, and 3 percent were certified **nurse-midwives**.¹⁰⁷

A survey of Corps clinicians in 1989 highlighted the essential role that the program has in maintaining access to health care for many communities. More than half of survey respondents practiced in **C/MHCs**. The remainder were in office-based practices, the Indian Health Service, hospital clinics, or prison clinics. Approximately 50 percent of these physicians reported if they were to leave, their patients would have no nearby source of free or subsidized care. Of those whose patients would, 33 percent said the likely alternative would be the hospital emergency room.¹⁰⁸

are out of the control of the **individual**.^b Behavioral choices, however, are posited to be determined by education (ed), income (y), health insurance (HI), **the behavioral** norms or culture or of one's chosen peers (CULT), and perceived health status (t), as well as by health services (V_{-1}) and health outcomes received in the past (O_{-1}). We could write:

$$(3) b = b(\text{ed}, y, \text{HI}, \text{CULT}, \tau, V_{-1}, O_{-1}).$$

These behavioral choices are endogenous since behavior is influenced by past services and outcomes. Some analysts might argue that each of the "determinants" of b are endogenous as well, for they too result from choices the individual makes or has made. The overwhelming endogeneity of behavioral choices affects the appropriate empirical strategy for impact analysis, as discussed in the text.

Turning now to the other major determinant of health outcomes, health services received (V), we assume that they are a function of the local supply (both quantity and quality) of providers willing to treat the vulnerable populations, (SWP), the health service processing capacity of the individual (SPC), perceived health status (τ), and the ability to pay for health services (A). We could specify the health services equation as:

$$(4) V = V(\text{SWP}, \text{SPC}, \tau, A).$$

The supply of willing providers (SWP) is presumed to depend upon local provider market conditions: the number of physicians and hospital beds per capita (MD/POP, BEDS/POP); the number of hospital outpatient departments and emergency rooms or the number of health personnel per capita employed there [(OPD+ER)/POP]; the number of community and migrant

^bWhile all individuals can move, many members of vulnerable populations may not have a great deal of choice about the type of environment in which they can afford to live.

health centers (**C/MHCs**) or the number of health professionals per capita employed there (**HC/POP**); and the number of NHSC personnel per capita (**NHSCPERS/POP**) in the local area if they practice outside **C/MHCs**. In addition, the local supply of willing providers will be influenced by Medicaid payment policies (**MCDPAY**), Medicaid enrollment policies (**MCDROLL**), and the degree to which private payers can be overcharged to help subsidize care for the poor and vulnerable (**PRIVPAY**). This last influence is inversely related to the degree of competitiveness in local health service markets. For example, if private health plans have negotiated the prices they pay hospitals down to the true average cost for their enrollees, then hospitals have only limited abilities to cross-subsidize indigent care. This will, on average, reduce their willingness to treat and serve vulnerable populations. The complete supply of willing providers (**SWP**) equation can be specified as:

$$(5) \text{ SWP} = \text{SWP}(\text{MD/POP}, \text{BEDS/POP}, (\text{OPD+ER})/\text{POP}, \text{HC/POP}, \text{NHSCPERS/POP}, \text{MCDPAY}, \text{MCDROLL}, \text{PRIVPAY}).$$

Note the number of both health centers and NHSC personnel are directly related to HRSA funding initiatives. In addition to the direct effects of Medicaid spending on private providers generally, captured in the **MCDPAY** and **MCDROLL** variables, Medicaid spending could directly affect the supply of health center services, since it accounts for such a large percentage of health center funding. Therefore, Medicaid enrollment cutbacks and payment reductions, inevitable results of the block grant proposals in the 104th Congress, could put increased pressure on local delivery systems for the poor and vulnerable populations, and thereby ultimately reduce the quantity and quality of services received by all those dependent on health center providers.

Service processing capacity (SPC) reflects the commonly held assumption that individuals produce their own health outcomes with different inputs: their own and those they purchase or otherwise receive. The ability to produce health, all other things equal, depends upon the patient's knowledge base and attitudes about information and treatments that may come from health professionals. Some individuals, with ample private human capital (**PHC**, derived from education (ed), income (**y**), and culture (CULT)), have service processing capacities ranging from adequate to outstanding. Others, including many members of vulnerable populations, depend upon a social infrastructure (SI) for their service processing capacity, built up from educational programs (EDPROG) for clients and care givers alike, programs that enable beneficiaries to connect to the myriad social service and health programs for which they may be eligible (HOOKUP), and general outreach services (OUTR), including transportation services, that may be necessary for health services to be received and "processed" in the production of health. We could express service processing capacity as:

$$(6) \text{ SPC} = \text{SPC}(\text{SI}, \text{PHC}),$$

where the social infrastructure

$$(7) \text{ SI} = \text{SI}(\text{EDPROG}, \text{HOOKUP}, \text{OUTR}),$$

and private human capital

$$(8) \text{ PHC} = \text{PHC}(\text{ed}, \text{y}, \text{HI}, \text{CULT}),$$

can be explicitly specified as well. The ability to pay for health services (A), is a direct function of income (y) and health insurance coverage (HI), or

$$(9) \text{ A} = \text{A}(\text{y}, \text{HI}).$$

Note that the lagged health services term in equation (2) is simply a lagged version of equation (4), or

$$(10) V_{-1} = V(\text{SWP}_{-1}, \text{SPC}_{-1}, \tau_{-1}, A_{-1}).$$

We now have a complete set of recursive equations that summarize the many influences on health outcomes of any person or target population. Using repeated substitution and combining terms, these equations could be combined to generate the overall summary (reduced form) model:

$$(11) 0 = O(\text{h,e,ed,y,HI,CULT,MD/POP,BEDS/POP,OPD+ER,HC,NHSCPERS, MCDPAY,MCDROLL,PRIVPAY,EDPROG,HOOKUP,OUTR}, X_{-1}, \epsilon),$$

where X_{-1} represents all variables lagged one period. Estimating equation (11) for the outcomes of interest is the direct way to test hypotheses about program impacts while properly controlling for the separate influences of intervening variables.

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